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10/568,571	02/16/2006	Yutaka Akahori	9319A-001559/US/NP	6474
27572 7590 05/08/2009 HARNES, DICKEY & PIERCE, P.L.C. P.O. BOX 828 BLOOMFIELD HILLS, MI 48303				
EXAMINER				
COMLEY, ALEXANDER BRYANT				
ART UNIT		PAPER NUMBER		
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/568,571

**Applicant(s)**

AKAHORI, YUTAKA

**Examiner**

ALEXANDER B. COMLEY

**Art Unit**

3746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 February 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) 2,3,15,21 and 22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,4-14 and 16-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/S508)  
Paper No(s)/Mail Date 3/9/2009.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application.
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Status of the Claims***

1. The Examiner acknowledges receipt of Applicant's amendments, remarks, and arguments filed with the Office on February 20<sup>th</sup>, 2009 in response to Non-Final Office Action mailed by the Office on August 22<sup>nd</sup>, 2008. Per Applicant's response, Claims 1, 4-5, 7-8, 10, 14, and 16 have been amended, while Claims 2-3, 15, and 21-22 have been cancelled. Consequently, Claims 1, 4-14, & 16-20 are now pending in the instant application. The Examiner has carefully considered each of Applicant's arguments and amendments, and they will be addressed below.

### ***Claim Objections***

2. The Examiner acknowledges receipt of Applicant's amendment to dependent Claim 5 in order to obviate the minor informalities. The Examiner accepts the corrections made thereto, and consequently has withdrawn the previous objection.

### ***Drawings***

3. The Examiner acknowledges the cancellation of Claims 21-22 in order to obviate the previous drawing objection. The objection is now moot due to the cancellation; hence, the objection is now withdrawn.

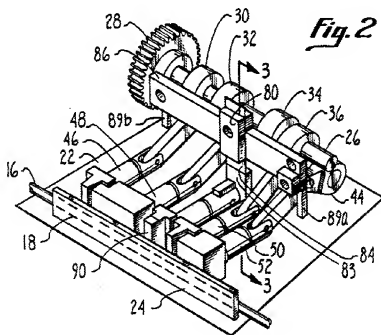
***Claim Rejections - 35 USC § 102***

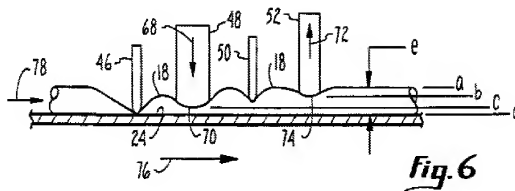
4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. **Claims 1, 4-14, and 16-20** are rejected under 35 U.S.C. 102(b) as being anticipated by United States Patent No. 5,217,355 to Hyman et al. directed to a Two-Cycle Peristaltic Pump with Occlusion Detector.





In regards to Independent **Claim 1**, and with particular reference to Figures 2 & 6 shown immediately above, Hyman et al. (5,217,355) discloses:

(1) A tube pump (10) for transferring a fluid, comprising: a tube (16) defining a flow path therein through which the fluid is transferred, the tube being capable of being deformed elastically, the tube having two curved portions provided at two spaced portions of the tube for opening and closing the flow path; and two opening/closing mechanisms (32, 36) which are provided so as to correspond to the two curved portions respectively for closing the flow path at the two spaced portions of the tube by deforming the corresponding curved portion of the tube and opening the flow path by restoring the deformed curved portions; wherein each of the curved portions has a pushed portion which is pushed by the corresponding opening/closing mechanism to be deformed and an opening/closing portion which is folded to close the flow path when the pushed portion is pushed by the corresponding opening/closing mechanism, the opening/closing portion is provided at a position out of the pushed portion,

wherein, when one of the two opening/closing portions is further folded after closing the flow path at the corresponding portion of the tube by operating the corresponding opening/closing mechanism in a state where the other opening/closing portion is folded by the corresponding opening/closing mechanism to close the flow path, an internal pressure in the tube between the two opening/closing portions is increased due to the further fold of the opening/closing portion, and the tube pump transfers the fluid using the increased internal pressure in the tube wherein the degree of the fold of the tube at the one opening/closing portion is larger than that at the other opening/closing portion to generate the increased internal pressure.

**(14)** A tube pump (10) for transferring a fluid, comprising: a tube (16) defining a flow path therein through which the fluid is transferred, the tube being capable of being deformed elastically, the tube having two curved portions provided at two spaced portions of the tube for opening and closing the flow path, and the two curved portions being arranged so as to face to each other through a predetermined space therebetween; and an opening/closing mechanism provided in the space between the two curved portions for closing the flow path at the portion corresponding to each of the two curved portions by deforming the tube at the curved portion and for opening the flow path by restoring the deformed curved portions; wherein each of the curved portions has a pushed portion which is pushed by the opening/closing mechanism to be deformed and

an opening/closing portion which is folded to close the flow path when the pushed portion is pushed by the opening/closing mechanism, the opening/closing portion is provided at a position out of the pushed portion; wherein, when one of the two curved portions is further folded after closing the flow path at the corresponding curved portion of the tube by operating the opening/closing mechanism in a state that the other curved portion is folded by the corresponding opening/closing mechanism to close the flow path, the degree of fold of one curved portion becomes differentiated from that of the other curved portion so that an internal pressure of the tube between the two curved portions is increased due to the further fold of the opening/closing portion, and the tube pump transfers the fluid using the increased internal pressure of the tube.

As best shown in Figure 2 above, Hyman discloses a peristaltic pumping device that is utilized for precisely metering the flow of medical fluids to a patient. The tube has various "curved portions" spaced along its length (the basic physical cross-section of the tube is round, or curved), and the closing mechanisms are disposed therebetween. Hyman's pump utilizes different sized reciprocating fingers (48, 52) in order to maintain increased internal pressure within the tube. The fingers are reciprocated by a rotating camshaft with four individual cams corresponding to the four individual fingers. In particular, Hyman states "Each cam 30, 32, 34 and 36 contacts a corresponding linkage. Only linkage 44, which is associated with cam 36, is shown in FIG. 2. The cams 30, 32, 34 and 36 against the respective linkages and thereby drive pump fingers 46.

48, 50, and 52 respectively." (Column 4, Lines 55-62) As best seen in Figure 6 above, the pumping fingers (48, 52) are sized differently from one another in order to pump different amounts of fluid through the tube, and consequently, provide increased pressure therein. In particular, Hyman states "With respect to the description of the invention herein, "large" and "small" describe pumping fingers which are constructed to move against tube portion 18 such that the amount of fluid displaced as "large" finger 48 moves downward against tube 18, is approximately two (2) times that displaced by an equal reciprocal downward motion of "small" finger 52. It is important to note that the reciprocal motion of fingers 48 and 52 is generally equal in range, but that in the fully extended position, the pumping fingers 48, 52 do not ever fully occlude the tubing." (Column 5, Lines 58-68) Hyman goes on to disclose the function of the "pinching" fingers (46, 50) by stating " In particular, pinching fingers 46 and 50 are of identical configuration, and serve as pinch valves. Fingers 46 and 50 are movable between a withdrawn position as shown in FIG. 4, and an extended position as shown in FIG. 5. Taking a single finger 46 as an example, as can be appreciated with reference to FIGS. 4 and 5, rotation of shaft 26 causes corresponding rotation of shape-formed cam 30. Cam 30 is positioned on shaft 26 to urge against an elbow 56, which is formed between drive link 58 and pivot link 60. Drive link 58 is pivotally attached to drive member 62, which is in turn fixedly attached to finger 46." (Col. 5, Lines 12-23) From this, it is clear that pumping fingers and pinching fingers function together in order to provided increased internal fluid pressure by cyclically deforming and restoring the pump tubing. Moreover, a flexible tube (such as tube 16) inherently has two curved sections that

would function as Applicant's "push portions", while the outside edges of these "push portions" are where the tubing is "folded" rather than "pushed", thereby functioning as Applicant's "opening/closing portions". And finally, it is clear from Figures 2 and 6 that the mechanisms 48 and 52 are of different sizes in order to generate the increased internal pressure within the tube (See Column 5, Lines 58-68)

6. In regards to dependent **Claim 4**, Figure 2 best shows how the curved portions of the tube are folded through the pushing of the pumping fingers (48, 52) by their corresponding cam portions (32, 36). Regarding dependent **Claims 5-6**, the fingers (46, 48, 50, 52) and the cams (30, 32, 34, 36) form the cam mechanisms that each press against the tube and force fluid therethrough. The fingers (48, 52), as seen in Figure 6, are sized differently from one another in order to provide increased fluid flow while the cams (30, 32, 34, 36), as also seen in Figure 2, are semi-circular in shape. In regards to dependent **Claims 7-10 & 18**, the fingers/linkages of each cam mechanism are disposed on a base plate 22 and form a reciprocating frame that is driven by the cams (30, 32, 34, 36). As the cams are rotated, the frames are reciprocated toward and away from the tubing by the action of the rise and dwell of the cams, as well as the by resilient action of the tube itself. The cams' dwell portions each serve to help bias the frame away from the tubing and release the fold applied thereto. In such a linkage, the fingers act as the direct connection between the tube closing portions and the frame. Regarding dependent **Claims 11-13 & 19-20**, Figures 2 best shows that the pump of Hyman utilizes a platen (i.e. fixing jig) to position the tube upon the base. In particular,

Hyman states "The components of peristaltic pump apparatus 10 can be best appreciated with reference to FIG. 2, where it will be seen that peristaltic pump apparatus 10 includes a base 22 which has a generally flat platen 24. Platen 24 provides a surface against which portion 18 (shown in phantom in FIG. 2) of tube 16 may be occluded." (Column 4, Lines 49-54) Obviously, adjustment of this platen, or jig, directly affects the amount of compression applied by the adjacent cam mechanisms. Furthermore, Hyman discloses that the pinching fingers (46, 50) alternately fully occlude/fully open the flow tube. In particular, Hyman states "As can be appreciated from the disclosure above, and again referring to finger 46 as an example, the reciprocating motion of finger 46 causes it to alternately press against and withdraw from tube portion 18. Finger 46 thereby alternately occludes and opens tube portion 18." (Column 5, Lines 31-36) Consequently, the flow path is always closed by one of the two pinching fingers fully occluding the tube. In regards to dependent **Claims 16-17**, Applicant's "stepped cam" is taught by Hyman's cam/linkage/finger mechanism (See Figure 2). In particular, Hyman's mechanism comprises four separate semicircular cams (i.e. cam portions) that actuate linkages (i.e. arms) in order to reciprocate differently sized fingers (i.e. actuators). The outer peripheral surfaces of each cam rotate to convert rotational motion into linear reciprocating motion in order to bring each of the linkages (i.e. arms) and fingers (i.e. actuators) into physical contact with the opening/closing portions of the tube. Hyman states "Mounted on base 22 is a rotatable shaft 26, which is driven by a motor (not shown) that engages with gear 28. Shaft 26 also includes cams 30, 32, 34 and, 36. Each cam 30, 32, 34 and 36 contacts a

corresponding linkage. Only linkage 44, which is associated with cam 36, is shown in FIG. 2. The cams 30, 32, 34 and 36 against the respective linkages and thereby drive pump fingers 46, 48, 50, and 52, respectively." (Column 4, Lines 55-62) Hence, the different sized, co-rotating fingers of Hyman's stepped cam mechanism provide tube folding in a "stepwise manner" in order to produce efficient fluid flow through the tube.

### ***Response to Arguments***

7. Applicant's arguments filed February 20<sup>th</sup>, 2009 have been fully considered but they are not persuasive. The Examiner's responses can be seen below.

8. In regards to Applicant's argument that Hyman's pump doesn't fold the tube by pushing another portion of the tube, the Examiner must respectfully disagree. As shown in the figures above, the two "pumping fingers" 48 and 52 are large, wide fingers that reciprocate up and down in order to squeeze the tube, but not fully occlude it (See Col. 5, Lines 49-53) However, the two "pinching fingers" 46 and 50 do, in fact, completely occlude the tube, and reciprocate in phase with the two pumping fingers in order to provide increased internal pressure within the tube and provide efficient pumping action (See Col. 5, Lines 12-48). These pinching fingers, therefore, fold the flow path to close it at a position away from the pushing (i.e. opening/closing) portions.

***Conclusion***

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALEXANDER B. COMLEY whose telephone number is (571)270-3772. The examiner can normally be reached on M-F 7:30am - 5:00am EST (Alternate Fridays Off). If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon C. Kramer can be reached on (571)-272-7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

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/Alexander B Comley/  
Examiner, Art Unit 3746

/Devon C Kramer/  
Supervisory Patent Examiner, Art  
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ABC